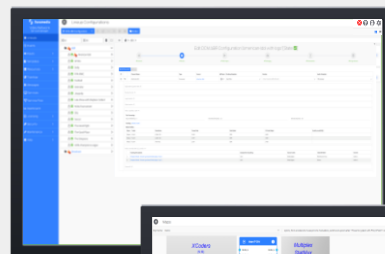


Synamedia Video Network Service Manager Overview

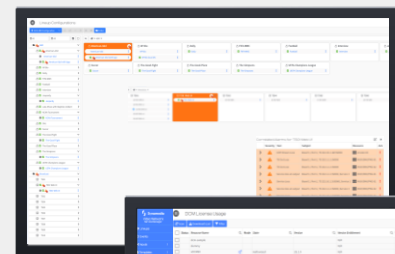
The Video Network Service Manager (VSM) is Synamedia’s management product dedicated to the operations of Service and Media Provider’s Streaming, Satellite, Cable and Telco distribution video and audio systems.

The Video Network Service Manager is the centralized interface for all operations. It configures, controls, monitors, and ensures the high availability of Synamedia Video Network Products and Applications.

The product ideally fits streaming and broadcast 24/7 head-end operations that require a service-oriented management solution.



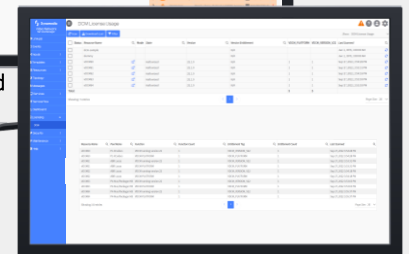
Service Configuration



Correlated Alarms



Topology



Centralized Licensing

Video Network Service Management - Centralized Web User Interface

Key Benefits

The Video Network Service Manager system provides a complete solution for end-to-end management of digital video and audio service platforms. It is designed to:

- **Simplify Operations.** The user-friendly Web UI is the centralized interface for all operations. It facilitates the service-oriented configuration with templates and embedded consistency controls. Off-line preparation and Bulk actions reduce the amount of actions and human errors in production.
- **Increase Uptime.** The management of service redundancy through automated failover capabilities reduces the impact on the service by rerouting or reconfiguring services in the event of a failure. Extensive fault and alarm management makes troubleshooting easier with alarm correlation and filtering features.
- **Optimize resources.** Flexible resiliency modes (1:1, N:M) allow to optimize the usage of resources. Density parameters are considered during services allocation onto resources. Floating licenses are also managed by the embedded Central License Server.

Service-Oriented Management

The Synamedia Video Network Service Manager offers service-oriented features enabling a consistent support for configuration, resiliency management and monitoring across all the stages of the media processing workflow: Encoding, Transcoding, Multiplexing, Scrambling, Packaging.

The product typically addresses the following workflows:

- Live Linear Streaming Pipeline, consisting of vDCM xCoding, vDCM Packaging, DRM and Origin for ABR live streaming delivery
- Broadcast Statmux for Cable, DTH and Terrestrial delivery
- Broadcast CBR for IPTV delivery
- Broadcast Linear TS processing

These are available for traditional hardware-based infrastructures, virtualized and container orchestrated deployments.

Video Network Service Manager allows users to easily deploy new channel lineups on the fly and modify them with minimal disruption. Reconfiguration, adding or removing services is fast, easy and error-free. Templating, wizards, consolidated data views and powerful copy-and-paste operations are available in the User Interface.

Complementary to the service-oriented management, the product also exposes a system-oriented view on individual resources such as Synamedia Digital Content Manager (DCM), Virtual Digital Content Manager (vDCM), Encoder D9036 and PowerVu Professional Receiver (D9800) series. Video Network Service Manager also controls third-party baseband video routers and switches, and a variety of other¹ video network devices.

¹ Contact your local Synamedia account representative or distribution partner for details.

Video Network Service Manager Description

The Video Network Service Manager system allows to manage audio and video services and map them onto monitored resources whether they are running on appliances or as software instances (bare metal, virtualized, or orchestrated containers).

Operators perform frequent configurations and reconfigurations of multiple processing resources throughout their video distribution and processing platforms. The Video Network Service Manager **Lineups Configuration Manager** is a tool that helps solving issues of engineering and operational complexity. It enables to create service configurations, manage variants, perform quick service changes and modification, automate changes through scheduling, or even prepare service configurations offline without accessing each individual device GUI. The configuration is made intuitive with the help of wizards and consistency controls, context sensitive embedded help. Once configured, services can be activated or deactivated and the real-time state is reported. Some multi-selection and filtering features make bulk actions easy, and offer an efficient way to operate a large number of channels.

The Video Network Service Manager **Pool Resource Application** provides a flexible way to manage resiliency and resource allocation. Within a resource pool, you can configure its resiliency behavior from the following choices:

- None — For resource pools without service protection.
- Heartbeat-Controlled — The services are protected by a resource pair (1:1 redundancy scheme). The resources must have an identical resource layout. VSM does not manage the automated backup transitions.
- Resilient-Reserved — The services are protected by a resource pair that must have an identical resource layout (1:1 redundancy scheme). VSM manages the automated backup transitions.
- Resilient-Shared — The services are protected by replacing failing resources by free resources that are part of the same pool. VSM manages the automated backup transitions.

Inputs can be configured independently so that the service configuration just refers to them. A large variety of sources is supported (IP, SDI, ASI, Zixi, SRT, TS, RTMP, HTTP, SDI over IP, 2110). The product offers to option to scan and import sources. Acquisition rules can also be defined to define backup sources and the logic for selecting a backup source.

The Video Network Service Manager **Templates** help to simplify service configurations and ensure some consistency across all services. Various templates are available such as:

- Linear Xcode templates
- ABR Xcode templates
- Audio templates
- Stream protection templates
- Service protection templates
- Packaging templates
- ABR encryption templates

- Origin storage templates

Alarm templates are also offered for the management of static device configuration (DCM, vDCM).

The Video Network Service Manager **Topology Manager** allows graphical creation and setup of the equipment topology, providing an easy interface for selecting devices from the inventory. The Topology Manager provides an immediate overview of the device alarms present on the topology, allowing the user to visually correlate alarms on channels that are present on the platform.

The Video Network Service Manager provides a powerful **Messages** handler that can help guard the health of your applications and confirm the correctness of the configured events. The message handler is populated with messages coming from devices or software instances, messages accompanying events, and messages coming from the VSM itself. Each message has a complete set of information (such as severity, instance, service impacted, description) that can be used in filters and correlation tools for efficient analysis and troubleshooting.

Service Monitoring metrics are exposed in the **Dashboards** menu of the product. A set of pre-defined Grafana dashboards are provided with Synamedia's products and allows operators to access many system KPI (such as CPU load, memory usage, disk usage, network traffic) and application metrics (in and out bitrates, CC errors, dropped packets...). Customizable alerting rules can be configured based on these metrics (this relies on the Prometheus alert manager).

Multi-Stage lineups (that require several resources) are monitored in real-time in the **Service Flow** view. For each channel, the view shows the flow passing through resources from the source to the mux output, with connectivity links displayed and alarm information so that identifying the cause of a problem is straight forward.

Event (or session) management is an application typically used by operators to manage live content transported from one location to another or to other multiple locations. Managing this type of application, also called contribution management, allows operators and engineers to focus on service definitions, rather than opening each individual device user interface.

Product Features Highlights

Video Network Service Manager Web UI

- The Web UI offers a universal access from a browser, removing the need for any client installation or updates.
- The User Interface allows pre-production and production operations, including the management of:
 - Service inputs and their acquisition rules
 - Configuration Templates
 - Lineups, containing the settings of various processing stages for a service
 - Service configurations variants
 - Processing Resources
 - Resiliency Pools (1:1 and N:M)
 - Alarms and information events
 - Topology maps
 - Manage the Licenses Pool

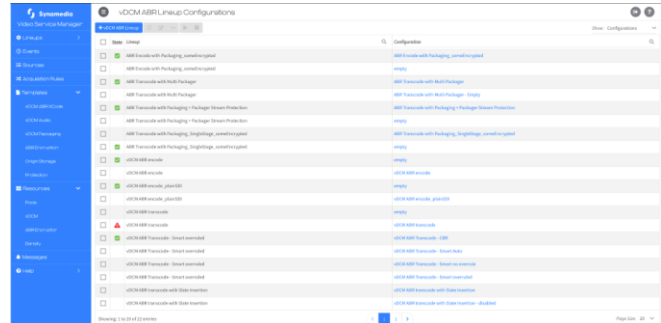


Figure 1: Video Network Service Manager Workflow View

Lineup Configuration Management

- The Lineup Configuration Management is an essential component of the UI.
- A Lineup contains all settings of all devices required for a service.
- Lineups can gather multiple variants for a service configuration making easy to switch from one to another.
- The Lineup Configuration Management allows the operator to perform various actions:
 - Activating/Deactivating
 - Organize in folders
 - Select List or Tiled views
 - Schedule configurations changes
 - Duplicate lineups and configurations
 - Multi select, Filter
- Get an immediate status for active services

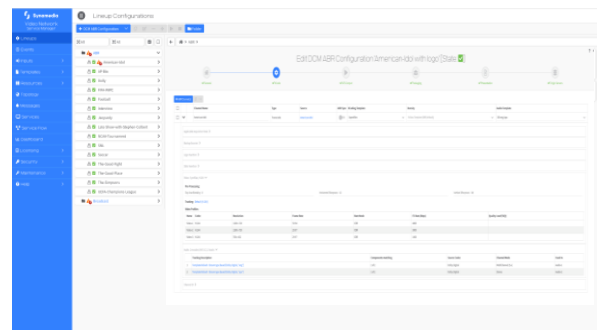


Figure 2: Lineup Configuration

Video Network Service Manager Topology Manager

- The Topology Manager supports creation of a network topology by entering devices from the inventory and assigning the interconnection between the devices.

- It exposes to the operator a consistent overview of alarm status, mirror, and redundancy state.
- The user can create and model a headend topology where devices are interconnected through links connected to the individual device ports.
- It provides hierarchical grouping of devices in locations and sublocations.
- Multiple views can be open at the same time.
- Views are updated across multiple clients.
- The user can add background images.



Figure 3: Topology View

Grafana Monitoring Dashboards

- Containerized solutions track a large amount of metrics which are stored in a Prometheus database
- Grafana dashboards are provided to visualize the evolution of key performance indicators
- Metrics relate to both system and application layers
- Alerting rules can be configured based on metrics conditions

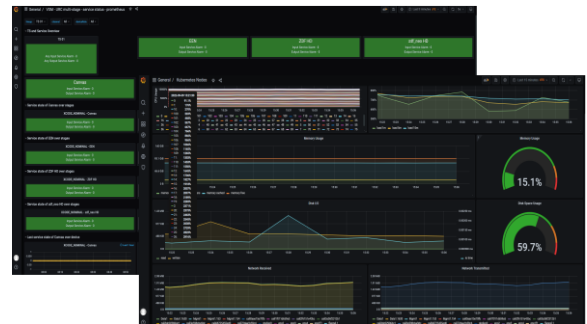


Figure 4: Monitoring Dashboards

Table 1. Synamedia Video Network Service Manager Feature Summary

Access and User Interface	<ul style="list-style-type: none"> • Centralized Operations with Web UI access • Embedded HTML help • Local, Radius, LDAP Active Directory based authentication
Service Oriented Configuration	<ul style="list-style-type: none"> • Streaming, Broadcast, and IPTV use cases • Sources scan and import • Multi-processing stages workflows (Xcode, Mux/Package) • Lineups management supporting service configuration variants • Lineups organization (folders, filters, list and tile views) • Wizard and template-based configuration • Consistency controls
Resources Management	<ul style="list-style-type: none"> • Appliances • Bare metal SW • Orchestrated containers • Redundancy pools • Topology maps

Monitoring and Alarming	
	<ul style="list-style-type: none"> Built in alarm collection and representation Service Status representation Alarm correlation (service / resource) Multi-criteria filters Service Flow (graphical view from the source to the output) Grafana dashboards for containerized products
Automation	
	<ul style="list-style-type: none"> Built-in Scheduler for Configuration and CA Event Management for Contribution Use Cases Mirrored Configurations for Main/Backup Sync Offline Preparation of target configuration
API and Interfaces	
	<ul style="list-style-type: none"> REST API for configuration, alarm forwarding, inventory population SNMP for event and alarms forwarding
Deployment modes / High Availability	
	<ul style="list-style-type: none"> Bare metal and Virtualized: Standalone Linux Server (1 node) and High Availability Cluster (3 nodes) Container Orchestrated: Video Network Kubernetes Cluster (3 nodes)

Video Network Service Manager – HW Requirements

The product is delivered as an appliance or as a software only. The appliance is based on a Video Network Server node as described in table 2:

Table 2. Synamedia VN Compute Node configured models, details on www.synamedia.com

Configured Model	Platform	Processor	Drive	Memory	Network Interfaces	Power supply
VN-NODE-S	SYNA-UDP	2x Intel® Xeon® Silver 4110	2x 1.2TB HDD	8x 8GB DDR4-2666 1Rx8 ECC	Four onboard copper Gigabit Ethernet ports - 10/100/1000 Mbps	2x 750W Redundant

Host requirements for the software for other types of deployment:

Table 3. Video Network Service Manager Server – Resources Requirements

Description	Specification
Minimum Host Requirements	2 vCPU, 6 GB RAM, 30 GB of available hard disk space, 10/100 Ethernet Network Adapter
Recommended Host Requirements	4 vCPU, 8 GB RAM, 60 GB of available hard disk space, 10/100/1000 Ethernet Network Adapter

Table 4. Video Network Service Manager – Operating System Requirements

Description	Specification
Linux Operating system (OS)	Minimum CentOS/RHEL 7.2 - 7.9, 64 bits Recommended Oracle Linux/RHEL 8.3 - 8.6, 64 bits

For more information

For more information about Synamedia video solutions, visit: www.synamedia.com.